

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US2004/043474

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C07D471/14 C07D471/22 A61K31/551 A61P31/12 A61P35/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C07D A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, BEILSTEIN Data, CHEM ABS Data, BIOSIS, EMBASE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 96/21663 A (MINNESOTA MINING AND MANUFACTURING COMPANY) 18 July 1996 (1996-07-18) Formula II, page 13, lines 17-22; claims 1,8; example 3	1-27
A	WO 02/46194 A (3M INNOVATIVE PROPERTIES COMPANY; LINDSTROM, KYLE J) 13 June 2002 (2002-06-13) Formula I, page 25, lines 1-14	1-27
A	US 6 541 485 B1 (CROOKS STEPHEN L ET AL) 1 April 2003 (2003-04-01) Formula I, column 14, line 38 - column 16, line 32	1-27
	-/--	



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

13 June 2005

Date of mailing of the international search report

20/06/2005

Name and mailing address of the ISA

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 95/02597 A (MINNESOTA MINING AND MANUFACTURING COMPANY) 26 January 1995 (1995-01-26) Formula I, page 13, lines 5-20 -----	1-27
A	WO 99/18105 A (ORTHO-MCNEIL PHARMACEUTICAL, INC) 15 April 1999 (1999-04-15) Formula I, page 3, lines 26-35 -----	1-27

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Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

Although claims 25-27 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2004/043474

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9621663	A	18-07-1996	US 5482936 A	09-01-1996
			AT 192153 T	15-05-2000
			AU 692033 B2	28-05-1998
			AU 4374396 A	31-07-1996
			CA 2209487 A1	18-07-1996
			CN 1173178 A ,C	11-02-1998
			CZ 9702204 A3	17-12-1997
			DE 69516540 D1	31-05-2000
			DE 69516540 T2	10-08-2000
			DK 802913 T3	25-09-2000
			EP 0802913 A1	29-10-1997
			ES 2145318 T3	01-07-2000
			FI 972967 A	11-07-1997
			GR 3033869 T3	31-10-2000
			HU 77667 A2	28-07-1998
			IL 116566 A	30-10-1998
			JP 10512256 T	24-11-1998
			NO 972801 A	19-08-1997
			NO 3198 A	19-08-1997
			NZ 298296 A	29-11-1999
			PT 802913 T	29-09-2000
			SK 87297 A3	10-12-1997
			WO 9621663 A1	18-07-1996
			ZA 9600101 A	08-07-1997
WO 0246194	A	13-06-2002	AU 3954702 A	18-06-2002
			BR 0116034 A	03-08-2004
			CA 2431040 A1	13-06-2002
			CN 1478090 A	25-02-2004
			CZ 20031593 A3	14-01-2004
			EE 200300273 A	16-02-2004
			EP 1343783 A2	17-09-2003
			HR 20030465 A2	30-06-2004
			JP 2004525868 T	26-08-2004
			MX PA03005013 A	05-09-2003
			NO 20032453 A	16-07-2003
			NZ 526085 A	24-12-2004
			PL 365739 A1	10-01-2005
			SK 7142003 A3	07-10-2003
			WO 0246194 A2	13-06-2002
			US 2002107262 A1	08-08-2002
			US 6525064 B1	25-02-2003
			US 6545016 B1	08-04-2003
			US 6545017 B1	08-04-2003
			US 2004019076 A1	29-01-2004
			US 2003186949 A1	02-10-2003
			US 2003195209 A1	16-10-2003
			US 2003162806 A1	28-08-2003
			US 2003176458 A1	18-09-2003
			US 2004147533 A1	29-07-2004
			US 2004157879 A1	12-08-2004
			US 2004186128 A1	23-09-2004
			ZA 200305238 A	27-08-2004
US 6541485	B1	01-04-2003	AU 766565 B2	16-10-2003
			AU 5328100 A	02-01-2001
			BR 0014214 A	08-09-2004
			CA 2376296 A1	21-12-2000

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2004/043474

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6541485	B1		CN 1355701 A ,C	26-06-2002
			EE 200100668 A	17-02-2003
			EP 1198232 A1	24-04-2002
			EP 1438958 A1	21-07-2004
			HR 20010889 A1	31-08-2003
			HU 0201664 A2	28-08-2002
			JP 2003501473 T	14-01-2003
			MX PA01012598 A	10-04-2002
			NO 20015504 A	07-02-2002
			NZ 515968 A	31-10-2003
			PL 352257 A1	11-08-2003
			SK 17972001 A3	04-06-2002
			TR 200103576 T2	21-06-2002
			WO 0076518 A1	21-12-2000
			US 6573273 B1	03-06-2003
			US 2004014754 A1	22-01-2004
			US 2004019048 A1	29-01-2004
			US 2004167154 A1	26-08-2004
			AU 772179 B2	08-04-2004
			AU 5328400 A	02-01-2001
			AU 773113 B2	20-05-2004
			AU 6334900 A	02-01-2001
			BR 0011433 A	05-03-2002
			BR 0011448 A	14-12-2004
			CA 2376304 A1	21-12-2000
			CA 2376305 A1	21-12-2000
			CN 1353609 A	12-06-2002
			CN 1354663 A	19-06-2002
			CZ 20014363 A3	13-03-2002
			CZ 20014364 A3	13-03-2002
			EE 200100669 A	17-02-2003
			EE 200100670 A	17-02-2003
			EP 1198233 A1	24-04-2002
			EP 1187613 A1	20-03-2002
			HR 20010888 A1	31-08-2003
			HR 20010890 A1	31-08-2003
			HU 0201431 A2	28-08-2002
			HU 0202254 A2	28-10-2002
			JP 2003501466 T	14-01-2003
			JP 2003501474 T	14-01-2003
			MX PA01012508 A	02-07-2002
			MX PA01012547 A	14-10-2003
WO 9502597	A	26-01-1995	US 5366974 A	22-11-1994
			AT 195735 T	15-09-2000
			AU 693747 B2	02-07-1998
			AU 4098797 A	08-01-1998
			AU 681687 B2	04-09-1997
			AU 7247594 A	13-02-1995
			CA 2167042 A1	26-01-1995
			CZ 9600105 A3	12-06-1996
			CZ 291419 B6	12-03-2003
			DE 69425661 D1	28-09-2000
			DE 69425661 T2	19-04-2001
			DK 708772 T3	18-09-2000
			EP 0708772 A1	01-05-1996
			ES 2149276 T3	01-11-2000
			IL 110091 A	18-03-1997

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2004/043474

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9502597	A		IL 119546 A	04-01-1998
			IL 119547 A	04-01-1998
			JP 9500128 T	07-01-1997
			MX 9405383 A1	31-01-1995
			WO 9502597 A1	26-01-1995
			US 5446153 A	29-08-1995
			US 5494916 A	27-02-1996
WO 9918105	A	15-04-1999	AT 267828 T	15-06-2004
			AU 1066499 A	27-04-1999
			CA 2305342 A1	15-04-1999
			DE 69824195 D1	01-07-2004
			DK 1023291 T3	04-10-2004
			EP 1023291 A1	02-08-2000
			ES 2221996 T3	16-01-2005
			JP 2001519351 T	23-10-2001
			PT 1023291 T	30-09-2004
			WO 9918105 A1	15-04-1999
			US 5968946 A	19-10-1999

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

REC'D 16 JUN 2005

PCT

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To:

see form PCT/ISA/220

21/4

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing

(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2004/043474

International filing date (day/month/year)
22.12.2004

Priority date (day/month/year)
29.12.2003

International Patent Classification (IPC) or both national classification and IPC
C07D471/14, C07D471/22, A61K31/551, A61P31/12, A61P35/00

Applicant
3M INNOVATIVE PROPERTIES COMPANY

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1 (a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2004/043474

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2004/043474

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

- ☐ the entire international application,
- ☒ claims Nos. 25-27 with respect to industrial applicability

because:

- ☒ the said international application, or the said claims Nos. 25-27 with respect to industrial applicability relate to the following subject matter which does not require an international preliminary examination (*specify*):

see separate sheet

- ☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):
- ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
- ☐ no international search report has been established for the whole application or for said claims Nos.
- ☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:
 - the written form ☐ has not been furnished
 - ☐ does not comply with the standard
 - the computer readable form ☐ has not been furnished
 - ☐ does not comply with the standard
- ☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.
- ☐ See separate sheet for further details

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-27
	No: Claims	
Inventive step (IS)	Yes: Claims	1-27
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-24
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item III.

Claims 25-27 relate to subject-matter considered by this Authority to be covered by the provisions of Rule 67.1(iv) PCT. Consequently, no opinion will be formulated with respect to the industrial applicability of the subject-matter of these claims (Article 34(4)(a)(I) PCT).

Re Item V.

Reference is made to the following documents:

- D1 : WO 96/21663 A (MINNESOTA MINING AND MANUFACTURING COMPANY)
18 July 1996 (1996-07-18)
- D2 : WO 02/46194 A (3M INNOVATIVE PROPERTIES COMPANY; LINDSTROM,
KYLE J) 13 June 2002 (2002-06-13)
- D3 : US 6 541 485 B1 (CROOKS STEPHEN L ET AL) 1 April 2003 (2003-04-01)
- D4 : WO 95/02597 A (MINNESOTA MINING AND MANUFACTURING COMPANY)
26 January 1995 (1995-01-26)
- D5 : WO 99/18105 A (ORTHO-MCNEIL PHARMACEUTICAL, INC) 15 April 1999
(1999-04-15)

The present invention relates to imidazopyridines and imidazoquinolines which are further fused with a diaza-heterocycle, and the use thereof as antiviral agents and for treatment of cancer.

The prior art describes a number of structurally related imidazopyridines and imidazoquinolines for the treatment of viral infections and cancer (D1-D4). None of the prior art documents discloses or suggests diaza-heterocycle-fused imidazopyridines or imidazoquinolines. The claimed subject matter is therefore considered novel and non-obvious over the cited prior art.

For the assessment of the present claims 25-27 on the question whether they are industrially applicable, no unified criteria exist in the PCT Contracting States. The

patentability can also be dependent upon the formulation of the claims. The EPO, for example, does not recognize as industrially applicable the subject-matter of claims to the use of a compound in medical treatment, but may allow, however, claims to a known compound for first use in medical treatment and the use of such a compound for the manufacture of a medicament for a new medical treatment.